

Missouri Department of Natural Resources

Missouri Department of Natural Resources
Regulatory Impact Report
In Preparation for Proposing
An Amendment to 10 CSR 20-7.031

Division/Program: Division of Environmental Quality, Water Protection Program

Rule number: 10 CSR 20 7.031 Rule title: Water Quality Standards

Type of rule action: Amendment to Existing Rule

Nature of the rulemaking: Affects environmental conditions, prescribes environmental standards, administrative, other conditions

Submitted by

Program Director

Date

Approval of the Completed Regulatory Impact Report

Legal Counsel

Date

Division Director

Date

Missouri Department of Natural Resources
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Applicability: Pursuant to Section 640.015 RSMo, “all rulemakings that prescribe environmental conditions or standards promulgated by the Department of Natural Resources...shall... be based on the Regulatory Impact Report...” This requirement shall not apply to emergency rulemakings pursuant to section 536.025 or to rules of other applicable federal agencies adopted by the Department “without variance.”

Determination: The Missouri Department of Natural Resources has determined this rulemaking prescribes environmental conditions or standards and verifies that this rulemaking is not a simple unvarying adoption of rules from other federal agencies. Accordingly, the Department has produced this regulatory impact report which will be made publicly available for comment for a period of at least 60 days. Upon completion of the comment period, official responses will be developed and made available on the agency web page prior to filing the proposed rulemaking with the Secretary of State. Contact information is at the end of this Regulatory Impact Report.

1. Describe the environmental conditions or standards being prescribed.

This rulemaking includes revisions that ensure that state water quality standards are functionally equivalent to federal standards and that improve the clarity, specificity and effectiveness of the standards. In summary, the revisions include the following:

Table A; Revised criteria for copper and zinc: Metals criteria for the protection of aquatic life were revised in 2005. This amendment proposes to revise the state criteria to reflect the latest federal guidance on developing criteria for copper and zinc as described in the National Recommended Water Quality Criteria, EPA, Office of Water, (4304T) 2006.

Ammonia Criteria: Total ammonia nitrogen criteria are determined by formulas that are dependent on temperature and pH. This revision will clarify how the criteria should be calculated based on temperature and pH and on the presence or absence of early life stages of fish.

Tables G, H and I; identification of classified and/or reference waters: Earlier methods of delineating the start and end points of classified water segments within the water quality standards were less accurate than a GIS based method and resulted in the non identification or misidentification of certain segments. This proposal corrects the descriptions. More accurate representation of the classified waters of the state ensures the appropriate application of Missouri’s water quality standards.

Table H; changes to the designation of Whole Body Contact Recreation and Secondary Contact Recreation as a result of Use Attainability Analyses: These changes will make the use designations consistent with the waters' ability (or inability) to support Whole Body Contact Recreation (WBCR) or Secondary Contact Recreation (SCR) as determined through the review of Use Attainability Analyses. This action includes restoring WBCR use to 52 stream segments where this use is attainable, designating SCR to 110 stream segments where existing SCR uses were observed, and removing the WBCR use on 47 stream segments where this use is unattainable. For a summary of the department's findings from the UAA reviews, see Attachment A – Supporting Documents, Results of Recreational Use Attainability Analyses, April 16, 2008. Reinstatement of WBCR use designation is recommended for approximately 165 miles of the Mississippi River from the mouth of the Meramec River to the Ohio River. No UAA has been conducted on this segment of the Mississippi River. This action is being taken pursuant to a discussion with the Clean Water Commission on January 4, 2006 (This discussion may be read on Pages 53-65 of the commission meeting minutes available on the web at http://www.dnr.mo.gov/env/wpp/cwc/cwc_m_010406.pdf)

Table H; changes to the designation of Whole Body and Secondary Contact Recreation as a result of stream classification of Black Creek, Deer Creek, and River Des Peres Segments of these streams met the criteria of the guidelines for water body classification and are proposed to be assigned class P.

New Tables L and M; Addition of nutrient criteria for lakes: The proposed rule includes methods to determine numeric nutrient criteria based on certain lake characteristics. These criteria will apply to all classified lakes with the exception of lakes located in the big river floodplains. Criteria for these lakes, as well as streams, will be addressed in a future rulemaking.

New Table K; addition of site-specific criteria for dissolved oxygen on East Fork Locust Creek and Little East Fork Locust Creek in Sullivan County, and West Fork Sni-a-Bar and Sni-a-Bar Creeks in Jackson County: This change proposes to establish revised criteria for dissolved oxygen on specific stream segments based on data gathered on reference streams within the same geographical area. These proposed criteria better reflect the natural dissolved oxygen levels of the streams in that area of the state and therefore provide a more appropriate basis for water quality assessments and water quality based effluent limits for Biochemical Oxygen Demand (BOD).

Correction of Typographical Errors: These changes correct several typographical errors discovered after the effective date of the last revisions to the water quality standards in 2005.

2. A report on the peer-reviewed scientific data used to commence the rulemaking process.

Table A; Revised criteria for copper and zinc: Recommended revisions to copper and zinc criteria are supported by the National Recommended Water Quality Criteria, EPA, Office of Water, (4304T) 2006. This document, which contains the supporting background

and science, is available from the web at <http://www.epa.gov/waterscience/criteria/nrwqc2006.pdf>.

Ammonia Criteria: The state adopted the national ammonia criteria as described in the 1999 Update of Ambient Water Quality Criteria for Ammonia (EPA 822 R 99 014) available on the web at <http://www.epa.gov/waterscience/standards/ammonia/99update.pdf>. This revision proposes to clarify the text, add calculation precision, and correct some typographical errors in Table B2 of the standards.

Tables G, H, and I; identification of classified and/or reference waters: This revision involves the use of a GIS based system to clarify or correct waterbody segment identifications within the water quality standards. No scientific analyses or data were involved in these decisions.

Table H; changes to the designation of Whole Body Contact Recreation and Secondary Contact Recreation as a result of Use Attainability Analyses: Each Use Attainability Analysis (UAA) contains information for assessing attainability of the WBCR or SCR use. Relevant information included evidence of an existing WBCR or SCR use and/or the measured depths of the water in accordance with recent revisions to the Missouri Recreational Use Attainability Analyses: Water Body Survey and Assessment Protocol dated December 19, 2007. The data were reviewed through an Internal Review Committee consisting of three environmental specialists within the department. The collective recommendation of the committee was documented in an Internal Review Committee Recommendation. Persons can review the data gathered during the UAAs and the Internal Review Committee Recommendations on the department's web page at http://www.dnr.mo.gov/env/wpp/wqstandards/uaa/uaa_county.htm

The Clean Water Commission members directed staff to add the designation of secondary recreation (SCR) use where the use was documented as "existing". See Attachment A Supporting Documents and pages 66 73 of the commission meeting minutes at <http://www.dnr.mo.gov/env/wpp/cwc/documents/cwc-m-090606.pdf>.

Table H; changes to the designation of Whole Body and Secondary Contact Recreation as a result of stream classification of Black Creek, Deer Creek, and River Des Peres Stream classification guideline underwent peer and public review before the Commission approved it. The Final Guidelines for Water Body Classification (5/2005) may be viewed at: http://www.dnr.mo.gov/env/wpp/wqstandards/water_classification_guidelines.pdf.

New Tables L and M; Addition of nutrient criteria for lakes

The proposed rule has been developed consistent with federal rule 40 CFR 131.12, Section 304(a) of the Clean Water Act and EPA's published guidance. Decisions on specific criteria were based on analysis of data from over 140 lakes and reservoirs throughout the state. Dr. Jack Jones and his colleagues at the University of Missouri have been collecting the data since 1976. (See "Limnology Data Set" in Attachment A Supporting Documents.)

The Regional Technical Assistance Group (RTAG) for EPA's Region VII (IA, KS, MO, NE) also provided data (See "RTAG Data Set" in Attachment A Supporting Documents), technical advice, and assistance.

Development of the rule followed a series of nineteen meetings, beginning in October, 2005, with a stakeholders' advisory group (A table listing the "Meetings of the Nutrient Criteria Stakeholder Group" and the "Meetings of the Nutrient Criteria Technical Subcommittee" is available in Attachment A Supporting Documents). This group consisted of representatives of a variety of interested parties, including municipalities, agriculture, and environmental advocacy groups, as well as the Missouri Department of Natural Resources (the Department), the Missouri Department of Conservation, U.S. Environmental Protection Agency (EPA), and staff from the Department of Fisheries and Wildlife Sciences at the University of Missouri Columbia. In December 2006, after a review of the draft rule and rationale by EPA, the group made the decision to form a technical subcommittee to look more closely at the data. The technical subcommittee met eight times since January 2007. A list of the peer reviewed science and rationale used in the development of the proposed nutrient criteria for lakes can be found in Attachment A Supporting Documents, Rationale for Missouri's Proposed Nutrient Criteria Rule – April 7, 2008.

New Table K; addition of site-specific criteria for dissolved oxygen on East Fork Locust Creek and Little East Fork Locust Creek in Sullivan County, and West Fork Sni-a-Bar and Sni-a-Bar Creeks in Jackson County: Site specific criteria for dissolved oxygen in East Fork and Little East Fork Locust Creeks and West Fork Sni a Bar and Sni a Bar Creeks are supported by information contained in the following non peer reviewed documents (see Attachment A Supporting Documents):

East Fork Locust Creek and Little East Fork Locust Creek:

Proposed Site-Specific Dissolved Oxygen Criteria for East Fork Locust Creek, February 2006; Revised May 2006. Prepared by MEC Water Resources, Inc. on behalf of the City of Milan and Premium Standard Farms.

Petition Requesting Site Specific Dissolved Oxygen Water Quality Criteria for East Fork Locust Creek, February 2006. Submitted by the City of Milan and Premium Standard Farms.

Letter dated July 31, 2006 from Robert Brundage of Newman, Comley and Ruth P.C. RE: Site Specific Dissolved Oxygen Water Quality Criteria for East Fork Locust Creek.

West Fork Sni-a-Bar Creek:

Proposed Site-Specific Dissolved Oxygen Criteria for Selected Reaches of the West Fork Sni-a-Bar and Sni-a-Bar Creeks, March 2006; submitted under letter dated July 12, 2007 from Trent Stober, MEC Water Resources, Inc. on behalf of the City of Blue Springs

Correction of Typographical Errors: No scientific analyses or data were involved in the identification or correction of the typographical errors.

3. A description of the persons who will most likely be affected by the proposed rule, including persons that will bear the costs of the proposed rule and persons that will benefit from the proposed rule.

Table A; Revised criteria for copper and zinc: Because the proposed revision will raise the water quality criteria for copper and zinc, persons who treat their wastewater for these metals may see some economic relief where modifications to the treatment are allowed. A list of facilities having permits with copper and/or zinc limits can be found in Attachment A Supporting Documents. The effect of this rule on each facility depends on the type of treatment system, the levels of the metals in the wastewater and in the receiving stream and the applicability of anti backsliding requirements. Because these factors are unique to each facility and are unknown at this time, the department is unable to determine from this list which facilities would be affected (benefit from this rule) or to what extent.

Ammonia Criteria: The proposed changes have no expected effect, either monetarily such as costs or benefits, or otherwise on any person. The revision simply clarifies the language without modifying the interpretation or the intent of the rule.

Tables G, H, and I; identification of classified and/or reference waters: This proposed rule would ensure that permits and water quality assessments are supported by an accurate water segment classification system. This accuracy reduces the potential for mistakes in the identification of applicable water quality standards and, consequently, for these errors to result in inappropriate permit terms and conditions or inaccurate water quality assessments. Avoiding these mistakes will save both the permit applicants' and the department's time and expense in preparing and reviewing applications for permits.

Table H; changes to the designation of Whole Body Contact Recreation (WBCR) and Secondary Contact Recreation (SCR) as a result of Use Attainability Analyses:

Domestic sewage treatment facilities that discharge to stream segments where WBCR and/or SCR use were evaluated through a UAA may be affected by this rule. Some facilities will be exempt from disinfecting the effluent because the UAA demonstrated that the whole body contact recreation use is not attainable and the secondary contact recreation does not exist in the receiving stream. Other facilities will be required to disinfect because the UAA demonstrated the attainability of WBCR use or the existence of SCR in the receiving stream.

Persons benefiting from the rule amendment would be those who enjoy recreational activities in the streams on which the rule amendment designates recreational use. The bacteria standards that would apply to these designated waters would serve to protect the health of the persons recreating in the streams.

Table H; changes to the designation of Whole Body Contact Recreation as a result of stream classification of Black Creek, Deer Creek, and River Des Peres.

Black and Deer Creeks are in the River Des Peres watershed. There are eleven non municipal outfalls in the River Des Peres watershed above its confluence with Gravois Creek. None of the facilities will be affected by this rule because no of their discharges currently have the potential to individually or collectively cause the bacteria standards to be exceeded in Black Creek, Deer Creek or River Des Peres. Table 3.1 below lists all facilities in this watershed and their number of outfalls.

Table 3.1: Facilities in the River Des Peres Watershed above Gravois Creek Confluence:

PERMIT #	NO. OF OUTFALLS	FACILITY NAME	TYPE1	TYPE2
MO0116661	4	BNSF, LINDENWOOD YARD	RAILR	STO R
MOG350195	1	LACLEDE GAS SHREWSBURY HO	PET S	STO R
MOG490185	1	ROCK HILL QUARRIES COMPANY	LIM Q	NO T
MOG490324	1	BRECKENRIDGE MAIN PLANT	LIM Q	NO T
MOG490342	1	RAINERI BUILDING MATERIAL	LIM Q	NO T
MOG760031	1	OLD WARSON COUNTRY CLUB	POOL	FILTR
MOG760063	1	ALGONQUIN GOLF CLUB	POOL	CHLOR
MOG970006	1	LADUE MULCH SITE	CMPST	STO R

New Tables L and M; Addition of nutrient criteria for lakes:

Persons Affected Point Sources:

There are about 2,000 permitted facilities producing a nutrient load from wastewater that are located within the watersheds of classified lakes and reservoirs. Of these, about 25 percent have stormwater permits, 25 percent have general permits, and the remaining 50 percent of permits are site specific. More than 85 percent of these facilities are within the watersheds of the ten largest reservoirs in the state. (See Figure 3.2). Nutrients are a common element in domestic wastewater. There are about 140 Publicly Owned Treatment Works (POTW) and over 360 subdivisions that may be affected by the rule. Of these, 235 of the subdivisions are within the Lake of the Ozarks watershed, and 60 are in the Table Rock Lake watershed. Other facilities that have domestic wastewater and therefore may be affected by the rule include 82 mobile home parks, 56 campgrounds 54 resorts, 30 motels, 20 restaurants, and 27 schools. The probability of any of these facilities receiving new limits on nutrients will depend on the trophic condition of the lakes within their watersheds, and the distance between their outfalls and the receiving lake.

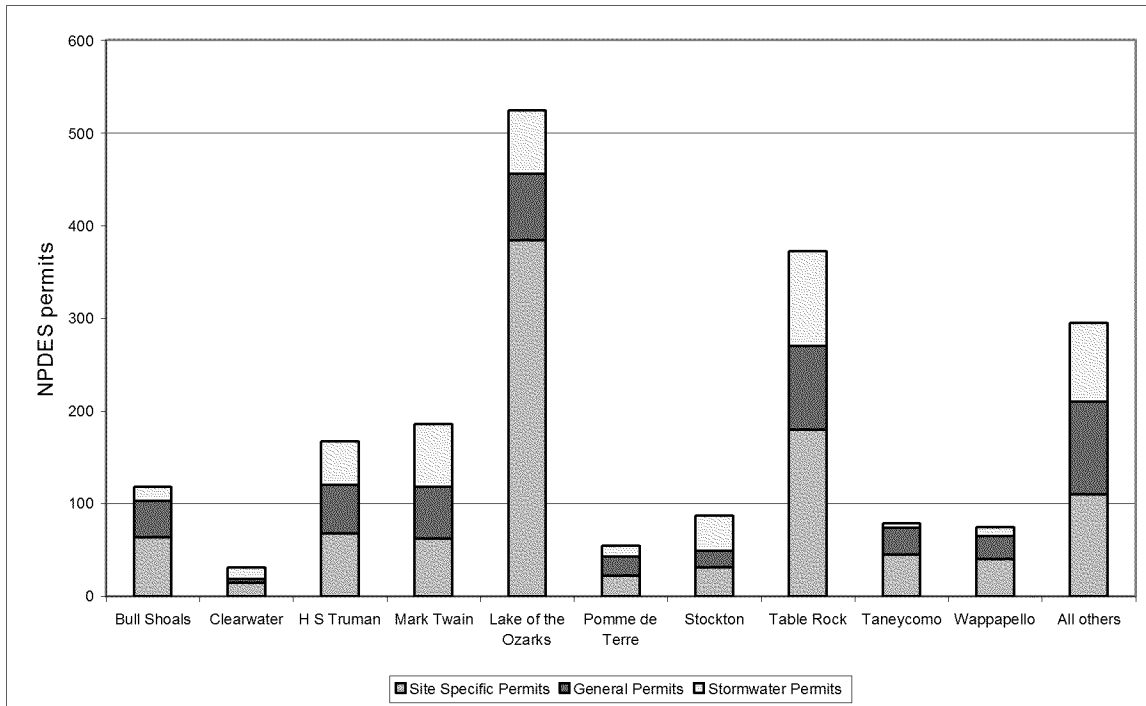


Figure 3.2 Distribution of permitted wastewater facilities within lake watersheds.

Persons Affected Non-point sources

The most widespread non point source contributor to nutrient loading of lakes and reservoirs is row crop agriculture. Row cropping occurs primarily in the glaciated and Osage plains regions of the state. Processes of nutrient loading include overland flow and soil erosion. Other forms of agriculture, particularly livestock production, are likely significant contributors.

Non point source contribution may be controlled through incentive programs that promote Best Management Practices (BMP) and environmental awareness. The US Department of Agriculture's Natural Resource Conservation Service (NRCS) and the Department's Soil and Water Conservation Program (SWCP) are the major sponsors of this effort.

"Best management practices are methods that have been determined to be the most effective and practical means of preventing or reducing pollution. These practices are often employed in agriculture, forestry, mining and construction. The EPA, working with partners in industry and the academic community have established and published best management practices for soil erosion, wastewater treatment, fuel storage, pesticide and fertilizer handling and the management of livestock yards. The ultimate goal of these practices is to increase efficiency while reducing pollution."

http://www.epa.gov/rgytgrnj/economics/pdf/epa_r7wwpd_06_002.pdf

Examples of BMP include nutrient management plans, reduced tillage, buffer strips along streams, and crop rotations. NRCS programs include the Environmental Quality Incentives Program (EQIP), and the Conservation Security Program (CSP). SWCP offers cost share for

specific conservation practices, and the Agriculture Non Point Source Special Area Land Treatment (AgNPS SALT) program targets selected watershed areas for land treatment. For lakes and reservoirs that are in non compliance with the rule, coordination with these agencies will be essential to addressing the problem. Implementation will, in many cases, be a long term process. Landowners who participate in these programs can benefit from the BMP by protecting the soil's productive capacity and using fewer costly chemicals.

The other principle source of non point source nutrient loading is urban run off. As with agriculture, runoff from certain urban activities is not regulated except in metropolitan municipalities covered by MS4 permits. Educational and outreach programs work to improve lawn care management and reduce nutrient loading.

Stormwater runoff from urban areas is regulated by the municipal separate storm sewer system (MS4) permit. Urban stormwater may contain significant amounts of nutrients from fertilizers. There are 152 municipalities in Missouri that are required to manage their stormwater runoff under Phase II of the NPDES. MDNR staff have determined that runoff from 38 of these communities may affect the water quality of some lakes.

Persons Benefited Both Point and Non-point Sources

In direct economic terms, the greatest beneficiaries from the proposed rule may be owners of lake front property. Several studies have indicated that increased water clarity associated with nutrient reduction is a significant factor in raising the value of such property. (Michael et al., 1996; Wilson and Carpenter 1999). Steinnes (1992), found an average increased value of \$235 per lakeshore lot for each 1 meter increase in water transparency as measured with Secchi disk.

Other economic beneficiaries include businesses that are reliant on tourism related lake recreation, such as restaurants, hotels, and marinas, as well as gas stations both near to and on the way to or from resort areas. Several studies demonstrated relationships between lake water clarity and levels of tourist recreation (Bouwes and Schneider, 1979; Ribaud and Epp, 1984; Smith et al, 1986; Ribaud and Epp, 1984; Wilson and Carpenter, 1999).

In more tangential terms, the public at large will benefit. Drinking water systems that use reservoirs as a source would experience fewer episodes of taste and odor problems that can occur as a consequence of excessive nutrient loading (MDNR, 2006). Furthermore, improved water quality in drinking water reservoirs would lead to a reduction in the cost of treating the water. Protected and enhanced water clarity will maintain and improve opportunities for whole body contact recreation. And, while some sport fishing potential is enhanced with higher nutrient loading, the potential for greater aquatic biodiversity tends to increase with reduced nutrient loading (Egertson and Downing, 2004).

New Table K; addition of site-specific criteria for dissolved oxygen on East Fork Locust Creek and Little East Fork Locust Creek in Sullivan County, and West Fork Sni-a-Bar and Sni-a-Bar Creeks in Jackson County: The Cities of Milan and Blue Springs are the only two entities directly affected by this amendment. Both of these cities may see

modifications to their permits reflecting greater allowances for discharges of Biochemical Oxygen Demand (BOD). Premium Standard Farms, who is a co petitioner for the site specific criteria on East Fork Locust Creek, will not see any direct effects as they are no longer discharging from the Milan Processing Plant.

Correction of Typographical Errors: The existing typographical errors could result in some misunderstanding of the standards. This amendment might prevent misunderstandings that could cause delays in decisions based on the sections of the rule affected by the typographical errors.

4. A description of the environmental and economic costs and benefits of the proposed rule.

Table A; Revised criteria for copper and zinc: The proposed revisions to copper and zinc criteria are in response to changes in EPA guidance regarding establishing appropriate thresholds to prevent toxic effects on aquatic life. An explanation of the basis for the changes in the federal guidance can be reviewed in the National Recommended Water Quality Criteria published in 2006 by EPA, Office of Water. Missouri is adopting these federal criteria and therefore the environmental and economic costs and benefits are determined by the actions at the federal level and not the state. While Section 536, RSMo, does not require a cost and benefit analysis when federal requirements are adopted without modification, this RIR notes that more than 300 facilities might be affected by this revision. A list of permitted facilities having NPDES permits with limits for copper and/or zinc is provided in Attachment A Support Documents.

Ammonia Criteria: There are no environmental or economic impacts associated with this rule amendment. The amendment achieves a perfect agreement between the values specified in Table B2 of the water quality standards and the results derived from the formulas footnoted by the table. This agreement will present less chance of misinterpretation and, therefore, misapplication of the criteria.

Tables G, H, and I; identification of classified and/or reference waters: This revision will result in better accuracy in the identification of classified waters. This improved accuracy will increase the efficiency of program activities that require the use of the classification information. The increased efficiency should reduce costs for both the applicants and the department.

Table H; changes to the designation of Whole Body Contact Recreation and Secondary Contact Recreation as a result of Use Attainability Analyses:

Environmental Benefit: The designation of recreational uses to streams and, consequently, the application of a pathogen standard (E. coli as an indicator) may require disinfection of effluent before it is discharged to waters designated to this use. The application of the standard will provide greater protection of public health during the recreational use. Persons who recreate in streams that have elevated levels of bacteria through runoff from areas containing livestock may also benefit from this rule. The use designations may place a

priority on the use of 319 grants in reducing pathogens levels in streams serving recreational uses.

Environmental Cost: Environmental effects might come from the recommended use designations through the discharge of disinfection by products when chlorination is used as the disinfection process. Some residual chlorine may enter the receiving water from the disinfection process unless dechlorination processes are required. Dechlorination may also introduce other contaminants, such as trihalomethanes, which may be carcinogenic. Where recreation does occur, the risks to human health from the by products are less severe than the risk of infection from non treated effluent. Where recreation does not occur, the addition of the by products would be the greater risk to the environment.

Economic Benefit: Economic benefits can be generated by environmental improvements. For example, areas where stream quality is good can prevent costs such as medical expenses to treat pollution related illnesses. Streams that support recreation are sometimes an important factor in a local economy, especially where recreation related services are needed, such as lodging or fee based camping, canoe or tube rental and food services. An exact quantification of these benefits is not possible without more data on the number of stream users, the illnesses that relate to pathogens already present in the water and the business income that results from the users during recreation. Because most of these streams do not show any evidence of existing recreation use and are small compared to the better known "float streams", any benefits are likely to be only occasional and confined to users who live in the vicinity of the stream.

Economic Cost: Facilities that are required to disinfect their discharges may spend between \$10,000 to \$100,000 depending on the size of their treatment system and on the type of disinfection process installed. Tables 4.1 through 4.4 demonstrate various ways to estimate the costs to comply with this rule. These costs are based on standardized rates and may be higher or lower depending on specific conditions at each facility. On the non point side, the economic cost will depend on the amount of funds directed toward conservation practices and other livestock management initiatives. These costs depend on the presence of volunteers willing to implement conservation practices on private property.

The current number of wastewater treatment plants (WWTPs or facilities) without bacteria monitoring that would be affected by this rule was obtained from the department's database. All cost estimates have been adjusted to reflect the cost of equipment, installation, and operation and maintenance for calendar year 2004 using the Engineering News Record Construction Cost Index (CCI). The use of either chlorination or an ultraviolet disinfection system was determined according to the size of a facility's design flow in million gallons per day (MGD).

The tables below show the estimated cost per facility for each of the four size ranges and two types of disinfection systems. Population equivalent (PE) has been presented in addition to design flow to provide supplemental information on population sizes affected should increased user rates result from the need to disinfect the effluent. Table 4.1 shows the number of facilities potentially affected by category of flow and type of disinfection system.

Table 4.2 displays installation costs and Table 4.3 shows the operation and maintenance (O & M) costs for these facilities.

Table 4.1: The number of facilities that may be affected

Flow (MGD)	Public		Private		Total
	Chlorination	UV	Chlorination	UV	
Flow less than 0.05 MGD PE < 500	25	11	30	20	86
Flow between 0.05 & 1.0 MGD 500 < PE < 10,000	21	7	2	0	30
Flow between 1.0 & 20.0 MGD 10,000 < PE < 200,000	0	5	0	0	5
Flow greater than 20.0 MGD PE > 200,000	0	0	0	0	0
Total	46	23	32	20	121

Table 4.2: Installation Cost

Flow (MGD)	Public		Private		Total
	Chlorination	UV	Chlorination	UV	
Flow less than 0.05 MGD PE < 500	\$250,000	\$454,630	\$300,000	\$826,600	\$1,831,230
Flow between 0.05 & 1.0 MGD 500 < PE < 10,000	\$338,100	\$819,742	\$32,200	\$0	\$1,190,042
Flow between 1.0 & 20.0 MGD 10,000 < PE < 200,000	\$0	\$4,860,000	\$0	\$0	\$4,860,000
Flow greater than 20.0 MGD PE > 200,000	\$0	\$0	\$0	\$0	\$0
Total	\$588,100	\$6,134,372	\$332,200	\$826,600	\$7,881,272

Table 4.3: O & M Cost per Year

Flow (MGD)	Public		Private		Total
	Chlorination	UV	Chlorination	UV	
Flow less than 0.05 MGD PE < 500	\$550,000	\$19,250	\$660,000	\$35,000	\$1,264,250
Flow between 0.05 & 1.0 MGD 500 < PE < 10,000	\$2,789,367	\$34,692	\$265,654	\$0	\$3,089,713
Flow between 1.0 & 20.0 MGD 10,000 < PE < 200,000	\$0	\$327,940	\$0	\$0	\$327,940
Flow greater than 20.0 MGD PE > 200,000	\$0	\$0	\$0	\$0	\$0
Total	\$3,339,367	\$381,882	\$925,654	\$35,000	\$4,681,903

Analytical bacteria testing costs were established by averaging the cost of fecal coliform (E. Coli testing data were not available at this time) and total residual chlorine testing from ten (10) laboratories in Missouri and neighboring states that serve Missouri facilities. Table 4.4 shows the potential cost due to analytical testing of fecal coliform (FC) and total residual chlorine (TRC) per each frequency and facility type.

Table 4.4: Total Average Testing Cost per Year

Flow (MGD)	Public		Private		Total
	FC	TRC	FC	TRC	
Flow less than 0.05 MGD PE < 500	\$8,407	\$4,146	\$9,830	\$3,702	\$26,085
Flow between 0.05 & 1.0 MGD 500 < PE < 10,000	\$10,622	\$4,351	\$285	\$180	\$15,438
Flow between 1.0 & 20.0 MGD 10,000 < PE < 200,000	\$9,776	\$0	\$0	\$0	\$9,776
Flow greater than 20.0 MGD PE > 200,000	\$0	\$0	\$0	\$0	\$0
Total	\$28,805	\$8,497	\$10,115	\$3,882	\$51,299

These calculations assume all wastewater facilities not currently disinfecting will install disinfection when the discharge is within two (2) miles of a classified water body designated for recreation. These calculations do not take into account the cost to future facilities that do not presently have an operating permit. Additionally, the cost estimate calculations assume that most mechanical wastewater treatment plants will use ultraviolet (UV) disinfection while lagoon systems will use chlorination. When UV is used, chlorination is not applicable and TRC cost is zero.

The frequency of bacteria testing is specific to each permit that would be affected by the recreational use designation and it is usually based on the facility design flow. It is assumed that facilities of similar size and type will most likely require similar monitoring frequency.

Table H; changes to the designation of Whole Body and Secondary Contact Recreation as a result of stream classification of Black Creek, Deer Creek, and River Des Peres.

In addition to whole body contact recreation and narrative criteria, these streams will be afforded numeric chronic criteria and antidegradation policy implementation without incurring significant cost. Economically, the classification will improve the aesthetic of the area and may augment tourism revenues and increase property value.

New Tables L and M; Addition of nutrient criteria on lakes: The cost to control nutrient loading as a result of this rule varies considerably, depending on the current condition of lake quality, the source of pollution (point or a non point source), and the types of additional nutrient management needed. The numbers of classified lakes that appear to exceed the proposed criteria are summarized in Table 4.5 below.

Table 4.5 Numbers of classified lakes exceeding the proposed criteria based on current data.

Lakes exceeding TP, TN, and Chl of the proposed criteria	8
Lakes exceeding only TP and TN of the proposed criteria	2
Lakes exceeding only TP of the proposed criteria	13
Lakes exceeding only TN of the proposed criteria	8
Lakes exceeding only TP and Chl of the proposed criteria	13
Lakes exceeding only TN and Chl of the proposed criteria	4
Lakes exceeding only Chl of the proposed criteria	7
Total lakes that exceed the proposed criteria	55

Cost of nutrient removal from point source discharges:

Total Phosphorus (TP) removal from wastewater discharges has costs that are dependent on a number of factors, the most significant being the size of the facility. Generally, the larger the facility, the lower the cost per unit mass of phosphorus removed. A study of wastewater treatment plants (WWTP) in six small communities in Texas illustrates the point (Keplinger et al., 2004). Figure 4.6 is a log transformed linear regression of the cost to remove a kilogram per day of TP from the effluent as it relates to quantity of WWTP discharge. Costs ranged from \$33.65 to \$799 per kg of TP removed. This translated to a monthly cost of \$1.19 per house in a town of about 15,000 people, and a cost of \$25.43 per house in a village of 360 people.

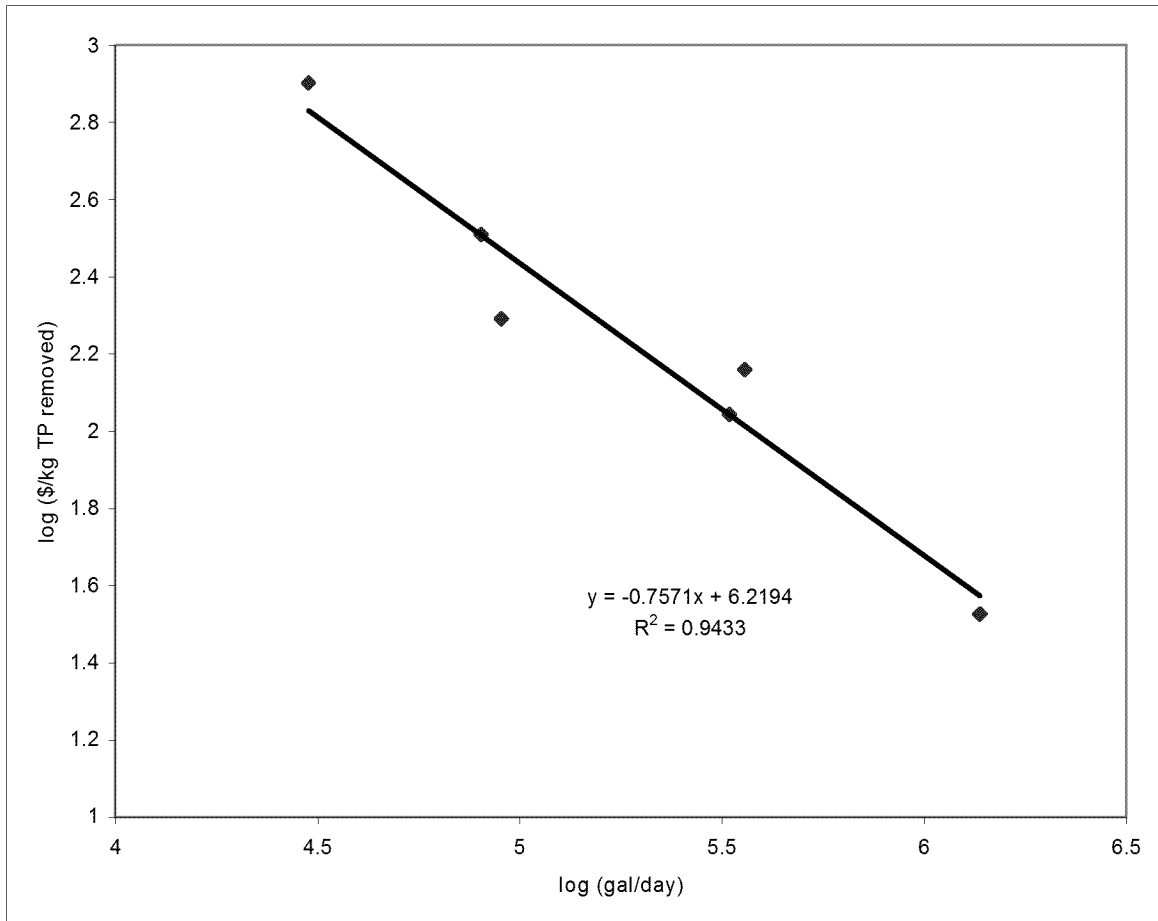


Figure 4.6 Cost of TP removal as a function of WWTP daily discharge in six communities in Texas (from Keplinger et al. 2004).

The higher cost per unit for smaller systems may be mitigated by a few factors. In several parts of the state, maintenance of smaller systems is contracted to operators. These parties often have the resources and the expertise to apply TP controls that otherwise may not be affordable to a small system owner. (Neher, 2007).

It is possible that waste load allocations developed from the proposed nutrient criteria for lakes would be less restrictive for facilities within lake watersheds but that do not directly discharge to a lake. This is because of the potential for effective nutrient reduction through instream processes and uptake by riparian vegetation. For example, phosphorus can be bound by organic matter which can then settle in stream sediments. Denitrification, the transformation of nitrate to nitrogen gas, can effectively remove nitrogen from the aquatic environment.

Under these circumstances, many facilities, particularly smaller ones, may qualify for relaxed limitations or no limitations at all. About 67 percent of wastewater outfalls in the lake watersheds have design flows of less than 22,500 gallons per day (gpd) and 18 percent have design flows greater than 100,000 gpd.

Besides the discharge capacity of the facility, other factors affecting the cost of nutrient removal include the type of wastewater treatment system, whether nutrient removal is being adapted to an existing system or installed as a part of a new system, and the target nutrient concentration in the effluent.

As the nutrient limit becomes more restrictive, cost of treatment tends to rise exponentially, as is illustrated in Figure 4.7 (Jiang et al. 2005; Waitman, 2007). Total annual economic cost in this study includes annualized capital costs, as well as annual costs for energy, labor, chemicals, sludge disposal, maintenance, and insurance.

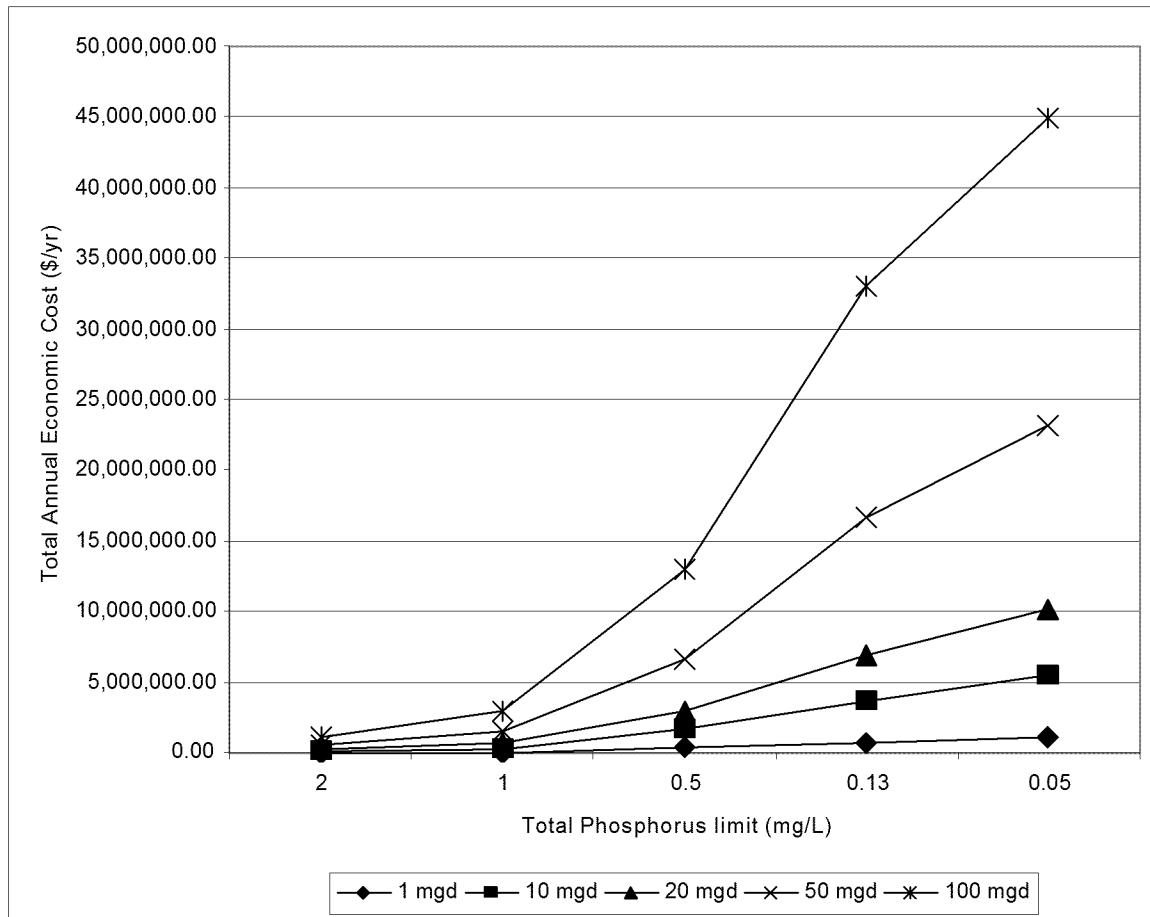


Figure 4.7: Total Annual Economic Costs for reducing Total Phosphorus in Activated Sludge treatment plants of varying design flow capacities (from Jiang et al, 2005)

Effluent rules 10CSR 20 7.015(3)(F) & (G) set an effluent limit of 0.5 mg/L total phosphorus as a monthly average and a schedule of compliance for facilities discharging in the Table Rock Lake and Lake Taneycomo watersheds. Facilities discharging one million gallons per day (1 MGD) or more complied with this rule by November 30, 2003. Some operators of small facilities (less than 1 MGD) have voluntarily installed phosphorus removal systems, out of concern that nutrient impairment of Table Rock Lake was affecting the resort business that they served. Capital and operating costs data for TP removal were

obtained from several of these facilities in the Table Rock Lake watershed and are shown in Table 4.8.

Table 4.8 Installation and operating costs for TP removal at individual WWTFs

Facility	Design Flow (MGD)	Installation Cost	Annual Operation & Maintenance Costs	Annual Lab Sample Costs	Total Annual Operating Costs
1	0.002	\$25,000	\$600	\$417	\$1,017
2	0.00462	\$2,000	\$567	\$80	\$647
3	0.00592		\$760	\$600	\$1,360
4	0.007	\$12,000	\$600	\$620	\$1,220
5	0.008	\$1,800	\$300	\$320	\$620
6	0.009	\$4,000			
7	0.009		\$760	\$600	\$1,360
8	0.009375		\$580	\$500	\$1,080
9	0.014		\$760	\$600	\$1,360
10	0.018	\$237,000			
11	0.045		\$12,480	\$216	\$12,696
12	0.12	\$100,000	\$18,600	\$1,800	\$20,400
13	0.3	\$2,428	\$13,136	\$180	\$13,316
14	42.5	\$1,600,000	\$700,000		\$700,000

Note: Regressions were calculated from the above data, yielding the following results:

Log [installation costs (\$)] = 0.5252 * log [design flow (gal/day)] + 1.7338 ($R^2 = 0.5284$)

Log [total annual operating costs (\$)] = 0.7745 * log [design flow (gal/day)] + 0.111 ($R^2 = 0.8087$)

The estimates, as calculated from the above regression equations are based on the median design flow within each range.

The number and size of facilities that may be affected by the proposed criteria for total phosphorus are presented in Table 4.9.

Table 4.9 Number and size of wastewater facilities possibly affected for total phosphorus statewide

Design Flow (MGD)	Public	Private	Totals
<0.005	0	17	17
0.005 0.05	5	11	16
0.05 0.5	6	2	8
0.5+	3	1	4
Totals	14	31	45

Tables 4.10 and 4.11 present statewide cost estimates for achieving compliance with the proposed phosphorus criteria.

Table 4.10 Estimate of total installation cost for phosphorus removal by facility type and design flow range:

Design Flow (MGD)	Public	Private	Totals	Yearly Cost* Based on 20 Year Loan
<0.005	\$0	\$16,979	\$16,979	\$1,362
0.005 0.05	\$61,527	\$135,359	\$196,886	\$14,271
0.05 0.5	\$279,365	\$93,122	\$372,487	\$22,953
0.5+	\$230,320	\$76,773	\$307,093	\$18,924
Totals	\$571,212	\$322,233	\$893,445	\$57,511

*yearly cost is based on interest rate (5% for private and 1% for public entities), amount of the loan (estimated cost), and a zero future value.

Table 4.11 Estimate of total yearly operation and maintenance cost for phosphorus removal:

Design Flow (MGD)	Public	Private	Total O&M Cost	Total O&M plus Amortization Costs
<0.005	\$1,177	\$18,834	\$20,011	\$21,373
0.005 0.05	\$8,021	\$44,115	\$52,136	\$66,407
0.05 0.5	\$113,779	\$37,926	\$151,705	\$174,658
0.5+	\$113,822	\$37,940	\$151,762	\$170,686
Totals	\$236,798	\$138,815	\$375,614	\$433,125

Assumptions;

- 1) Estimates are derived from regressions of treatment cost as a function of design flow. Regressions are as follows:
 - a) Capital Costs: $x = 1/\sqrt{[\text{MGD}]}$, $y = \log_{10}(\text{cost})$; $y = 0.102x + 4.983$; $R^2 = 0.755$; Robust Regression (least median squares).
 - b) Operation & Maintenance – Design flow < 0.01 MGD: $x = \text{gallons per day}$; $y = \text{annual cost}$; $y = 0.009x + 1154.63$; $R^2 = 0.753$; Robust Regression (least median squares).
 - c) Operation & Maintenance – Design flow ≥ 0.01 MGD: $x = \log_{10}(\text{gpd})$; $y = \text{annual cost}$; $y = 18650.925x - 75029.92$; $R^2 = 0.994$; Robust Regression (least median squares).
- 2) Capital and operation and maintenance cost data developed from interviews with managers of facilities that already treat for a total phosphorus limit of 0.5 mg/L.
- 3) Operation and maintenance includes chemical input, repairs, and lab analyses.
- 4) Estimates do not account for specific waste load allocations. Calculating those will not be accomplished in a short time.

Cost of nitrogen removal from point source discharges:

Biological Nutrient Removal (BNR) may be used to reduce total nitrogen in wastewater facilities. This technology has been implemented in the Chesapeake Bay area since 1983 and achieved total nitrogen limits of 8 mg/L and total phosphorus of 3 mg/L. Activated sludge enhanced nutrient removal system achieved a 3 and 0.3 mg/L of TN and TP respectively. The estimated total cost of planning, design, and construction of new activated sludge Enhanced Nutrient Removal (ENR) or upgrade of existing traditional system of 7 wastewater treatment systems in the Chesapeake Bay is summarized in Table 4.12 below.

Nutrient removal technology has been advancing rapidly in recent years. Less than 15 years ago, reduction of total nitrogen in effluent to 8mg/L cost about \$35 per pound of nitrogen removed. Now the costs are generally less than \$10 per pound, and \$4 per pound for those

facilities with some form of nutrient control already in place (Chesapeake Bay Commission, 2004). The following web sites provide further information on these figures:

Nutrient Reduction Technology Task Force 2002

http://www.chesapeakebay.net/pubs/NRT_REPORT_FINAL.pdf

Maryland Department of the Environment, Bay Restoration Fund (Senate Bill 320)

<http://www.mde.state.md.us/Water/CBWRF/index.asp>

Table 4.12 Cost estimate prepared for Maryland Department of the Environment:

Facility Name	Upgrade Description	Design Flow (MGD)		Capital Costs
		Old	New	
Celanese WWTP	Activated sludge replacing lagoon	1.25	1.66	\$15,833,000
Crisfield WWTP	Activated sludge upgrade with denitrification filters	1.0	1.0	\$10,100,000
Easton WWTP	Activated sludge replacing overland flow	2.35	4	\$38,913,000
Hurlock WWTP	Activated sludge replacing lagoon	1.65	1.65	\$7,285,000
Kent Island WWTP	Activated sludge replacing rotating biological contactor	2.0	3.0	\$33,200,000
Salisbury WWTP	Trickling filter modification, new denitrification filters	6.8	8.5	\$81,658,000
Talbot County Region II WWTP	Activated sludge replacing rotating biological contactor	0.5	0.66	\$13,747,000

The cost of upgrading a facility for nitrogen removal is dependent on a number of factors, including size of the facility and type of treatment. For systems with design flows of less than 0.5 MGD, there are two options for retrofitting; the addition of an anoxic tank or a deep bed denitrification filter (US EPA 2007). The anoxic tank option is applicable to systems that use the Modified Ludzack Ettinger (MLE) process, which is not common in Missouri, and particularly not in smaller systems. However, deep bed denitrification filters can be added to package plants. The estimates in Table 4.13 include pumps for secondary effluent to the filters and methanol feed equipment for nitrogen removal and chemical feed for phosphorus removal as well.

Table 4.13 Average costs for retrofits with deep bed denitrification filter. (US EPA 2007).

Design Flow (gpd)	Construction	Operation and Maintenance
4,000	\$145,655	\$21,573
10,000	\$161,691	\$22,309
25,000	\$196,434	\$24,883
50,000	\$217,815	\$30,399
100,000	\$213,000	\$28,600

For facilities with greater flows, there is a wider range of system upgrade options for nitrogen control. Systems already in use in Missouri include Anaerobic/anoxic/Aerobic Process (A²/O), Activated Sludge, Methanol, Oxidation Ditch, Rotating Biological Contactor (RBC), and Sequencing Batch Reactor (SBR). Table 4.14 is derived from a list of construction costs for facility upgrades in Maryland that operate in the aforementioned systems.

Table 4.14 Nutrient Reduction Upgrade Costs for Maryland Wastewater Treatment Plants (US EPA 2007).

Facility	Design Flow (MGD)	Treatment Process	Total Capitol Cost (2006\$)
Aberdeen	2.8	MLE	\$3,177,679
Annapolis	10	Ringlace	\$14,687,326
Black River	180	MLE	\$138,305,987
Ballenger	2.0	Modified Bardenpho	\$2,891,906
Broadneck	6.0	Oxidation Ditch	\$3,165,193
Cambridge	8.1	Activated Sludge	\$7,424,068
Chesapeake Beach	0.75	Oxidation Ditch	\$2,158,215
Dorsey Run	2.0	Methanol	\$3,967,307
Freedom District	3.5	Activated Sludge	\$1,462,798
Fruitland	0.5	SBR	\$7,546,764
Little Patuxent	18	A ² /O	\$7,263,879
Mt. Airy	0.6	Activated Sludge	\$5,235,575
Northeast	2.0	Activated Sludge	\$4,225,029
Parkway	7.5	Methanol	\$15,869,228
Patuxent	6.0	Oxidation Ditch	\$2,106,763
Poolesville	0.625	SBR	\$1,593,640
Princess Anne	1.26	Activated Sludge	\$4,311,742
Taneytown	0.7	SBR	\$3,808,298
Western Branch	30	Methanol	\$47,132,782
Westminster	5.0	Activated Sludge	\$5,274,444

The number and size of facilities that may be affected by the proposed criteria for total nitrogen, and the possible costs, are presented in Tables 4.15, 4.16 and 4.17. Many of these facilities are in the watersheds of lakes that also are high in total phosphorus. Nitrogen removal may not be necessary where phosphorus loading is found to be the most limiting nutrient to water quality impairment and where total nitrogen violation of the criteria is marginal.

Table 4.15 Number and size of wastewater facilities possibly affected for total nitrogen statewide

Design Flow (MGD)	Public	Private	Totals
<0.005	1	25	26
0.005 0.05	7	39	46
0.05 0.5	14	6	20
0.5+	11	2	13
Totals	33	72	105

Table 4.16 Total installation costs for affected facilities for nitrogen removal

Design Flow (MGD)	Public	Private	Totals	Yearly Cost Based on 20 Year Amortization
<0.005	\$278,635	\$6,965,889	\$7,244,525	\$574,401
0.005 0.05	\$2,504,215	\$13,952,054	\$16,456,268	\$1,258,321
0.05 0.5	\$7,924,705	\$3,396,302	\$11,321,007	\$711,678
0.5+	\$28,616,961	\$5,203,084	\$33,820,045	\$2,003,327
Totals	\$39,324,516	\$29,517,329	\$68,841,845	\$4,547,727

Table 4.17 Total yearly operation and maintenance costs for affected facilities for nitrogen removal

Design Flow (MGD)	Public	Private	Total O&M Cost	Total O&M plus Amortization Costs
<0.005	\$26,992	\$674,812	\$701,804	\$1,276,205
0.005 0.05	\$245,480	\$1,367,676	\$1,613,156	\$2,871,477
0.05 0.5	\$750,508	\$321,646	\$1,072,154	\$1,783,832
0.5+	\$1,402,276	\$254,959	\$1,657,235	\$3,660,562
Totals	\$2,425,256	\$2,619,093	\$5,044,349	\$9,592,076

Assumptions:

- 1) Estimates are based on regressions of treatment cost as a function of design flow. Data are from Biological Nutrient Removal Processes and Costs, EPA 823 R 07 002 and Municipal Nutrient Removal Technologies Reference Document (draft by Tetra Tech for EPA under contract EP C 05 046; WA 1 46). Regressions are as follows:
 - a) Capital Costs – Design flow < 0.1 MGD:
 - i) Lagoons: Replacement by sequencing batch reactors. $x = \text{MGD}$; $y = \text{cost}/\$1,000$. $y = 28306x^2 + 11847x + 392.01$.
 - ii) All other facilities: Retrofit with deep bed denitrification filter. $x = \text{MGD}$; $y = \text{total installation cost}$. $y = 207529x^3 - 49577x^2 + 3704.3x + 130.8$.
 - b) Operation & Maintenance – Design flow < 0.1 MGD.
 - i) SBR (converted lagoon); $x = \text{MGD}$; $y = \text{cost}/\$1,000$. $y = 3044.5x^2 + 1229.3x + 29.943$.
 - ii) All other facilities: $x = \text{MGD}$; $y = \text{cost}/\$1,000$. $y = 49343x^3 + 5236.4x^2 + 42.236x + 21.356$.
 - c) Capital Costs and Operation and Maintenance costs – Design flow ≥ 0.1 MGD. Estimated from CAPDETWorks models developed by Tetrattech. The following scenarios were used:
 - i) Oxidation Ditches retrofitted with phased isolation ditch;
 - ii) Extended aeration and activated sludge systems retrofitted with step feed system;
 - iii) Lagoon expanded with denitrifying filter system.
 - iv) For O&M expenses, actual flow is assumed to be 50 percent of design flow.
- 2) Capital and operation and maintenance cost data derived from literature, mainly from EPA, the State of Maryland, and the Chesapeake Bay Program
- 3) Operation and maintenance includes chemical input, repairs, and lab analyses.
- 4) Estimates do not account for specific waste load allocations. Calculating those will not be accomplished in a short time.
- 5) For most affected lakes, phosphorus is the limiting nutrient. Phosphorus control by itself may be sufficient to protect water quality. This analysis does not account for that.

Cost of Combined Nitrogen and Phosphorus Removal from point source facilities

There are only three point source facilities that have been identified in the watersheds of lakes that would exceed proposed criteria for both nitrogen and phosphorus. In some instances, combining treatment technologies for removal of both nutrient types may be less

costly then treating them separately. However, because of the small number of facilities affected, they were included in the preceding analyses for both phosphorus and nitrogen removal.

New Table K; addition of site-specific criteria for dissolved oxygen on East Fork Locust Creek and Little East Fork Locust Creek in Sullivan County, and West Fork Sni-a-Bar and Sni-a-Bar Creeks in Jackson County: The amount of economic benefit that the cities of Milan and Blue Springs would receive has not been calculated. A variance request from the City of Blue Springs (approved by the Clean Water Commission on September 12, 2007) states the current standard creates unreasonable costs without comparable environmental benefit. This discussion appears on pages 73–77 of the September 12, 2007 meeting minutes of the Clean Water Commission. These minutes are available from the department's web at http://www.dnr.mo.gov/env/wpp/cwc/documents/cwc_m_091207.pdf. Although both cities feel that the current dissolved oxygen criterion of 5 mg/L is inappropriate and would lead to unreasonable costs, neither provided economic information with their requests from which a cost savings could be calculated.

Correction of Typographical Errors: No significant economic and environmental costs or benefits are expected to result from the correction of the typographical errors.

5. The probable costs to the agency and to any other agency of the implementation and enforcement of the proposed rule and any anticipated effect on state revenue.

Table A; Revised criteria for copper and zinc: These proposed revisions would not change the process for the review of permit applications. Staff would perform reasonable potential analyses and calculate wasteload allocations for water quality based effluent limits in the same manner as done currently. Although the results of these analyses may be different, the amount of time involved with the effort will be the same. Therefore, no increased costs to the department are expected from this proposed rule.

Ammonia Criteria: Because this proposed revision is only a clarification, no costs are expected to be created by this action.

Tables G, H, and I; identification of classified and/or reference waters: This proposed rule revision should lead to more consistent and clear delineations of classified waters and therefore increased work efficiency and a reduction of costs for the department.

Table H; changes to the designation of Whole Body Contact Recreation and Secondary Contact Recreation as a result of Use Attainability Analyses: Establishing accurate use designations ensures the appropriate application of criteria and can eliminate unnecessary regulatory steps and delays in determining effluent limits for permits.

Table H; changes to the designation of Whole Body and Secondary Contact Recreation as a result of stream classification of Black Creek, Deer Creek, and River Des Peres.

It is very unlikely that the proposed classification of these streams will add any significant work or cost to the department or to any other agency. At the current situation of the area, no revenues are expected from this revision.

New Tables L and M; Addition of nutrient criteria for lakes: The rule will likely lead to an increased workload for the department as it administers the new criteria. An estimated 150 facilities (Tables 4.7 and 4.13) may need to implement additional treatment to achieve compliance. The department will be required to conduct a review of these permits for "reasonable potential" for exceeding the new criteria and evaluate treatment plans to ensure compliance. Increased monitoring by the department may be necessary to perform a complete assessment of water quality in lakes predicted to exceed the standards.

New Table K; addition of site-specific criteria for dissolved oxygen on East Fork Locust Creek and Little East Fork Locust Creek in Sullivan County, and West Fork Sni-a-Bar and Sni-a-Bar Creeks in Jackson County: This revision would substitute one criterion for another and would not affect the Department's work during water quality assessments or permit reviews. It saves the department from the cost of having to inappropriately place the affected streams on an impaired waters list based on the existing criteria, and consequently, having to address the listing through a standards revision at that time.

Correction of Typographical Errors: No costs to the department or any other agency is expected from the correction of the typographical errors.

6. A comparison of the probable costs and benefits of the proposed rule to the probable costs and benefits of inaction, which includes both economic and environmental costs and benefits.

Table A; Revised criteria for copper and zinc: With adequate data, a comparison could be made between the cost savings in treatment and the increase in metals concentrations which would result from this amendment. However, data are insufficient to determine the number and the extent to which treatment systems would be affected, and consequently, to determine the probable change in metals concentrations in the receiving waters.

Ammonia Criteria: Because this proposed revision is only a clarification of the existing rule, no costs are expected to be created by this action. Some savings may be expected to result in that this revision may prevent confusion in the rule's interpretation.

Tables G, H, and I; identification of classified and/or reference waters: Because this proposed revision only clarifies the existing classification system in the current rule, no costs are expected to be created by this action. Some savings may be expected to result in that this revision should eliminate confusion in locating the classified segments.

Table H; changes to the designation of Whole Body Contact Recreation and Secondary Contact Recreation as a result of Use Attainability Analyses: The costs and benefits of this proposed rule are discussed in response to Sections 4 and 5. Costs are generally associated with pollution control activities including disinfection systems for point sources and best management practices for non point sources. The average yearly cost for operating disinfection systems at municipal wastewater treatment systems, which are the most prevalent point source for bacteria pollution, is shown in Table 4.3. The cost of inaction, i.e. not requiring disinfection, would likely be seen in health care costs associated with illnesses attributable to pathogens in the wastewater that are discharged to the streams supporting recreation. This cost is difficult to ascertain. Records are not available to indicate the number of people who contract illnesses while recreating in streams receiving undisinfectd effluent. Therefore, this report is unable to make a comparison between this potential health care cost and the costs associated with disinfection. However, this report does observe that the costs associated with requiring disinfection to protect streams designated to WBCR by this rule is a new cost, whereas, the health care cost that would be attributable to not designating the use, and consequently not requiring disinfection, is a current cost.

Table H; changes to the designation of Whole Body and Secondary Contact Recreation as a result of stream classification of Black Creek, Deer Creek, and River Des Peres. If these stream segments remain unclassified their attainable uses will not be protected and will not qualify for antidegradation policy implementation.

New Tables L and M; Addition of nutrient criteria for lakes: The costs and benefits of the proposed rule are explained in response to item 4. The following consequences of inaction are specified in EPA's June 1998 National Strategy for the Development of Regional Nutrient Criteria:

“...if EPA determines that a new or revised nutrient standard is necessary for a State or Tribe (because EPA determines that the State or Tribe has not demonstrated reasonable progress toward developing numerical nutrient standards), EPA will initiate rulemaking to promulgate nutrient criteria values...”(US EPA, 1998).

If, due to inaction, EPA has to promulgate nutrient criteria, it is probable that criteria set by EPA would be more restrictive and less site specific than what are in the proposed rule. These could result in reduced regulatory flexibility for both the department and the regulated community, which could result in higher costs for compliance due to the more restrictive standard.

New Table K; addition of site-specific criteria for dissolved oxygen on East Fork Locust Creek and Little East Fork Locust Creek in Sullivan County, and West Fork Sni-a-Bar and Sni-a-Bar Creeks in Jackson County: The development of site specific criteria for dissolved oxygen would create an economic benefit for the facilities that currently discharge oxygen demanding pollutants to the segments. These facilities will avoid the cost of treatment necessary to achieve compliance with the current 5.0 mg/L dissolved oxygen standard. The Department would avoid having to inappropriately place the affected streams

on an impaired waters list based on the existing criteria, and consequently, having to later address the listing through a standards revision.

Correction of Typographical Errors: Neither this action or no action to correct the typographical errors would result in any significant difference in the costs or benefits associated with this rulemaking.

7. A determination of whether there are less costly or less intrusive methods for achieving the proposed rule.

Table A; Revised criteria for copper and zinc: Other methods for achieving the proposed rule, such a temporary variance from the standards, or the use of another method for criteria development would likely result in more stringent criteria. The federal criteria allows for some refinement of criteria to site specific conditions through a procedure called "species recalculation". However, that procedure is highly site specific and resource intensive and as such would not be considered a less costly or less intrusive method.

Ammonia Criteria: This revision does not create new requirements or any costs. The purpose of the revision is to improve the clarity of the rule. Therefore, it should not result in any change in the cost of compliance and should lessen any potential for confusion regarding the implementation of the rule.

Tables G, H, and I; identification of classified and/or reference waters: This revision does not impose any new costs on dischargers nor does it require significant changes in efforts to achieve compliance. Therefore, no other less costly or intrusive option exists to achieve the objective of this revision.

Table H; changes to the designation of Whole Body Contact Recreation and Secondary Contact Recreation as a result of Use Attainability Analyses: A UAA is required in order to rebut the presumption that recreation can be attained in the targeted waters and Missouri currently has only one protocol for performing the UAAs. Therefore, the methods chosen are the only methods available to achieve the proposed rule.

Table H; changes to the designation of Whole Body and Secondary Contact Recreation as a result of stream classification of Black Creek, Deer Creek, and River Des Peres. Since numeric chronic criteria and antidegradation review apply only to classified waters, without this rule, these stream segments will not be appropriately protected.

New Tables L and M; Addition of nutrient criteria on lakes: States are required to develop numeric nutrient criteria instead of relying on general criteria, as is done currently in Missouri, to identify and quantify water quality problems associated with nutrients. As described in response to item 2 of this report, the development of the proposed criteria involved discussions with a workgroup representing various interests. Because of the mix of the participants in this group, its work was aimed at finding the most effective criteria. The proposed criteria reflect the natural variations in reactions to nutrient loads by taking into account eco regional differences, lake depths and hydraulic residence time. The proposed

criteria also uses reference data to ensure the criteria properly reflect the levels of nutrient restrictions that are attainable.

Development of nutrient criteria has been a complex undertaking, with a large number of variables to take into account. We believe that, following consultation with a variety of experts in the field, the criteria proposed are the most effective that can be developed at this time.

New Table K; addition of site-specific criteria for dissolved oxygen on East Fork Locust Creek and Little East Fork Locust Creek in Sullivan County, and West Fork Sni-a-Bar and Sni-a-Bar Creeks in Jackson County: Other regulatory approaches to developing site specific criteria include 1) species recalculation, 2) water effect ratio and 3) a combination of approaches 2 and 3. None of these alternatives appear to present an acceptable method for supporting site specific criteria for dissolved oxygen (see response to Section 8). These tests generally measure toxicity or the effects of toxic pollutants and require extensive research under laboratory settings. Instead of site specific criteria, the Clean Water Commission may grant variances to water quality standards. However these actions are temporary and would not address the need for a permanent change.

Correction of Typographical Errors: Correcting the typographical errors in this rulemaking is the only reasonable alternative for addressing the errors.

8. A description of any alternative method for achieving the purpose of the proposed rule that were seriously considered by the department and the reasons why they were rejected in favor of the proposed rule.

Table A; Revised criteria for copper and zinc: Alternatives to the revised criteria, such as species recalculation or water effects ratio (WER), are highly site specific and resource intensive. The revisions proposed were preferred as the most science based alternative that would broadly protect the aquatic life use.

Ammonia Criteria: The purpose of the revision is to improve the clarity of the rule, with an intention to lessen any potential for confusion regarding the implementation of the rule. Any other method of making this clarification would not directly address the problem or provide a permanent fix.

Tables G, H, and I; identification of classified and/or reference waters: The department had previously extrapolated the location and extent of water bodies from paper maps and reported their boundaries in terms of legal descriptions. This method is not very accurate and may lead to either an under application or over application of the beneficial uses and criteria to classified waters. This proposed rule will eliminate these potential problems with the tables.

Table H; changes to the designation of Whole Body Contact Recreation and Secondary Contact Recreation as a result of Use Attainability Analyses: A UAA is required in order to rebut the presumption that recreation can be attained in the targeted waters and Missouri

currently has only one protocol for performing the UAAs. Therefore, the methods chosen are the only methods available to achieve the proposed rule.

Table H; changes to the designation of Whole Body and Secondary Contact Recreation as a result of stream classification of Black Creek, Deer Creek, and River Des Peres: There are no alternatives that would qualify these streams for the protection they deserve.

New Tables L and M; Addition of nutrient criteria on lakes: The specific effects of nutrient loading on designated uses for waters of the state are difficult to quantify and calibrate because of uncertainties associated with the relationships between causal and response variables. The tolerance of a waterbody for nutrient loading varies with a number of factors including local hydrology, geology, land cover and climate. Overall, however, excessive nutrient loading has been amply demonstrated to degrade the beneficial uses of surface waters.

Several earlier drafts of the rule segmented the state in the same fashion as the current one. They derived predicted values for total phosphorus based largely on hydrologic factors in the plains region and regional factors in the Ozarks. They also established a range between advisory and action levels to account for the uncertainty associated with the extent of nutrient loading that would lead to environmental degradation.

This approach lacked specific links to beneficial uses of water bodies, and it also lacked the identification of reference bodies to use as bench marks as allowed for in section 304(a) of the Clean Water Act. The current draft corrects that, and refines the hydrologic approach.

New Table K; addition of site-specific criteria for dissolved oxygen on East Fork Locust Creek and Little East Fork Locust Creek in Sullivan County, and West Fork Sni-a-Bar and Sni-a-Bar Creeks in Jackson County: The methods used to develop the proposed site specific criteria (reference stream approaches) were chosen by the petitioners for the development of site specific criteria. Site specific criteria are allowed by regulation and are subject to EPA review and approval. The Federal water quality standards regulation at section 131.1 l(b)(1)(ii) provides States with the opportunity to adopt water quality criteria that are modified to reflect site specific conditions. Site specific criteria, as with all water quality criteria, must be based on a sound scientific rationale. EPA recognizes that state standards for protection of aquatic life may be under or over protective if (1) the species at the site are more or less sensitive than those included in the national criteria data set (e.g., the national criteria data set contains data for trout, salmon, penaeid shrimp, and other aquatic species that have been shown to be especially sensitive to some materials), or (2) physical and/or chemical characteristics of the site alter the biological availability and/or toxicity of the chemical (e.g., alkalinity, hardness, pH, suspended solids and salinity influence the concentration(s) of the toxic form(s) of some heavy metals, ammonia and other chemicals). EPA recognized that laboratory derived water quality criteria might not accurately reflect site specific conditions and, in response, created three procedures to derive site specific criteria. These procedures were not chosen due to the dynamic nature of the dissolved oxygen environment. Use of the alternative methods below would have been very complex and inadequate in defining the effects of various levels of dissolved oxygen exposures.

1. The Recalculation Procedure is intended to take into account relevant differences between the sensitivities of the aquatic organisms in the national dataset and the sensitivities of organisms that occur at the site.
2. The Water Effect Ratio Procedure (called the Indicator Species Procedure in provided for the use of a water effect ratio (WER) that is intended to take into account relevant differences between the toxicities of the chemical in laboratory dilution water and in site water.
3. The Resident Species Procedure intended to take into account both of the above differences simultaneously. The resident Species Procedure for the derivation of a site specific criterion accounts for differences in resident species sensitivity, differences in biological availability and/or toxicity of a material due to variability in physical and chemical characteristics of the site's water.

Correction of Typographical Errors: Correcting the typographical errors in this rulemaking is the only reasonable alternative for addressing the errors.

9. An analysis of both short-term and long-term consequences of the proposed rule.

Table A; Revised criteria for copper and zinc: Both short term and long term consequences of this amendment are the same: the protection of aquatic life use without afflicting unnecessary cost to the industry.

Ammonia Criteria: This revision does not create new requirements or any costs. The purpose of the revision is to improve the clarity of the rule. Therefore, it should not result in any change in the cost of compliance and should lessen any potential for confusion regarding the implementation of the rule.

Tables G , H, and I; identification of classified and/or reference waters: This proposed amendment will improve the identification of classified water segments making it easily to track the various types of information relative to each waterbody, such as the standards that apply, the status of water quality, the discharges affecting the waterbody, etc. These identifications are essential to decisions relating to effluent limitations, compliance determinations and water quality restoration activities.

Table H; changes to the designation of Whole Body Contact Recreation and Secondary Contact Recreation as a result of Use Attainability Analyses: The short term consequence of the proposed rule is a change in permit terms and conditions in permits discharging to the targeted streams. The new permit conditions will establish a regulatory requirement for achieving the new bacteria standards. Some of these permits will contain schedules of compliance of up to three years to design, build and operate a disinfection system. The long term consequence is the annual operation and maintenance cost associated with wastewater treatment and the improved protection of public health during recreational use of the streams affected by this rule.

Table H; changes to the designation of Whole Body and Secondary Contact Recreation as a result of stream classification of Black Creek, Deer Creek, and River Des Peres. The short term and the long term consequences of this rule are to protect the uses in these streams through regular monitoring and assessment of their water quality.

New Tables L and M; Addition of nutrient criteria on lakes: Implementation of nutrient criteria will be through development of TMDLs for lakes that are identified as exceeding the criteria. The earliest probable listing will be in 2010, and calculation of load and wasteload allocations for those lakes that are listed will take a period of time after that. Therefore, negligible expense is anticipated in the short term.

However, we recognize that implementations through the TMDL process can be time consuming. It potentially places new discharges in these watersheds in limbo while waste load allocations are derived for the watershed. The department is committed to developing an implementation strategy that minimizes delays on new discharges in watersheds of impaired lakes and reservoirs.

Long term expenses will include point source upgrades as described in Section 4 of this report as well as staff time in bringing discharge permits into conformance with wasteload allocations. The other significant long term expenditure will be information and education efforts and the installation of best management practices in those areas where the principle nutrient dischargers are non point sources. As previously mentioned, these expenditures can be substantially reimbursed to landowners through state and federal conservation incentive programs.

Long term cost effectiveness and environmental benefits will support increased and sustainable quality of life for all, including, individuals and community businesses, agricultural facilities and other utilities in the watershed.

New Table K; addition of site-specific criteria for dissolved oxygen on East Fork Locust Creek and Little East Fork Locust Creek in Sullivan County, and West Fork Sni-a-Bar and Sni-a-Bar Creeks in Jackson County: Both the cities of Milan and Blue Springs might receive permits that reflect less restrictive limits on BOD as a result of this rule amendment. The long term consequences may be a reduction in dissolved oxygen within the streams to which the site specific criteria apply. However, because the new criteria reflect the dissolved oxygen levels expected to exist within natural settings, no short or long term effect to aquatic life is expected.

Correction of Typographical Errors: The correction of these typographical errors will avoid any confusion or delay in decisions based on the sections of the rule affected by the errors.

10. An explanation of the risks to human health, public welfare or the environment addressed by the proposed rule.

Table A; Revised criteria for copper and zinc: The proposed revisions to criteria for copper and zinc address the toxic effects of these metals to aquatic life. This amendment proposes to revise the state criteria to reflect the latest federal guidance on developing criteria for copper and zinc as described in the National Recommended Water Quality Criteria, EPA, Office of Water, (4304T) 2006.

Ammonia Criteria: The purpose of the revision is to improve the clarity of the rule. Its intent is to lessen any potential for confusion regarding the implementation of the rule. It does not address any risks to public health, welfare or the environment.

Tables G, H, and I; identification of classified and/or reference waters: The purpose of the revision is to improve the clarity of the rule. This change did not significantly affect any risks to public health, welfare or the environment.

Table H; changes to the designation of Whole Body Contact Recreation and Secondary Contact Recreation as a result of Use Attainability Analyses: The designation of recreational uses to surface waters recognizes the existing or potential contact people have with these waters. The application of pathogen criteria to these waters protects human health from the risk of gastrointestinal illness in waterbodies designated for recreation. The presence of E.coli bacteria in aquatic environments indicates that the water has been contaminated with the fecal material of man or other animals. This form of contamination may introduce pathogens or disease producing bacteria or viruses. Some waterborne pathogenic diseases include typhoid fever, viral and bacterial gastroenteritis and hepatitis A. The presence of fecal contamination is an indicator that a potential health risk exists for individuals exposed to this water. Fecal coliform bacteria may occur in ambient water as a result of the overflow of domestic sewage or nonpoint sources of human and animal waste.

Table H; changes to the designation of Whole Body and Secondary Contact Recreation as a result of stream classification of Black Creek, Deer Creek, and River Des Peres. The protection of whole body contact recreation in these waters will eliminate any human health concerns due to pathogenic infection.

New Tables L and M; Addition of nutrient criteria on lakes:

Aquatic life is impacted by nutrient loading at several levels. It can increase the probability of fish kills due to oxygen depletion that results from excessive algae growth. It can also undermine aquatic diversity by creating conditions favorable to certain fast growing species, such as carp and benthivores, at the expense of other species (Edgerton and Downing, 2004).

Drinking water problems are frequently attributed to specific species of algae that produce a range of toxicities. The consequences can include taste and odor problems and risks to human health as well as to livestock and wildlife. (Downing et al. 2001).

Whole body contact recreation can be impaired because of reduced water clarity associated with algae growth. This can affect the attractiveness of a water body for recreation, as well as safety concerns due to reduced water clarity.

New Table K; addition of site-specific criteria for dissolved oxygen on East Fork Locust Creek and Little East Fork Locust Creek in Sullivan County, and West Fork Sni-a-Bar and Sni-a-Bar Creeks in Jackson County: The rule proposes criteria that more closely matches the natural dissolved oxygen levels within the streams targeted for site specific criteria. Bringing the criteria closer in line with the streams' natural tendencies allows the department to offer more appropriate effluent limitations and allows the owners of wastewater facilities to avoid unnecessary treatment and the costs associated with the treatment. These costs can be significant and hinder the facility's efforts to provide other important pollutant control where it may be necessary to protect the stream uses.

Correction of Typographical Errors: These typographical errors do not pose any human health or environmental risks.

11. The identification of the sources of scientific information used in evaluating the risk and a summary of such information

Table A; Revised criteria for copper and zinc: This amendment is an adoption of the national recommended chronic criteria for copper and zinc. Therefore, the department defers to the science used in the national study for evaluating the risk to aquatic life.

Ammonia Criteria: The purpose of the revision is to improve the clarity of the rule. This change did not affect any risks to public health, welfare or the environment.

Tables G and H; identification of classified waters: The purpose of the revision is to improve the clarity of the rule. This change did not significantly affect any risks to public health, welfare or the environment.

Table H; changes to the designation of Whole Body Contact Recreation and Secondary Contact Recreation as a result of Use Attainability Analyses: A litany of studies have shown that public health is protected when the pathogen levels in recreational waters are controlled. Appropriate designation of WBCR and SCR through the Use Attainability Analysis process ensures public health is protected and risk of pathogen exposure is reduced where recreational uses are existing or attainable.

Table H; changes to the designation of Whole Body and Secondary Contact Recreation as a result of stream classification of Black Creek, Deer Creek, and River Des Peres. The classification of these waters is based on significant amount of flow and invertebrates data.

New Tables L and M; Addition of nutrient criteria on lakes:
Rationale for the criteria is provided in Attachment A Supporting Documents.

New Table K; addition of site-specific criteria for dissolved oxygen on East Fork Locust Creek and Little East Fork Locust Creek in Sullivan County, and West Fork Sni-a-Bar and Sni-a-Bar Creeks in Jackson County: Response to Section 2 of this report presents the science behind the recommended criteria. The supporting science includes data gathered from streams that represent the highest dissolved oxygen levels attainable in streams of the type considered for the site specific criteria.

Correction of Typographical Errors: These corrections are not proposed on the basis of science or reducing risk. Therefore, this section is not relevant to this revision. However, one correction is being made in accordance with a directive by the Clean Water Commission issued on May 3, 2006. The minutes of the May 3, 2006, Commission meeting may also be viewed at http://www.dnr.mo.gov/env/wpp/cwc/cwc_m_050306.pdf

12. A description and impact statement of any uncertainties and assumptions made in conducting the analysis on the resulting risk estimate.

Table A; Revised criteria for copper and zinc: The proposed revisions to copper and zinc criteria are in response to changes in EPA guidance regarding establishing appropriate thresholds to prevent toxic effects on aquatic life. An explanation of the basis for the changes in the federal guidance can be reviewed in the National Recommended Water Quality Criteria published in 2006 by EPA, Office of Water. Missouri is adopting these federal criteria and therefore the reader is deferred to the federal guidance for statements on the uncertainties and assumptions made in conducting the analysis on the resulting risks.

Ammonia Criteria: The purpose of the revision is to improve the clarity of the rule. This change did not affect any risks to public health, welfare or the environment.

Tables G and H; identification of classified waters: The purpose of the revision is to improve the clarity of the rule. This change did not significantly affect any risks to public health, welfare or the environment.

Table H; changes to the designation of Whole Body Contact Recreation and Secondary Contact Recreation as a result of Use Attainability Analyses: Uncertainties concerning the Use Attainability Analysis process and procedures are minimal. Intensive stream morphology measurements, interviews, and a robust public participation process ensure adequate data are collected to determine existing and/or attainable recreational uses. Any assumptions that must be made are conservative and minimize or eliminate any risk to human health.

Table H; changes to the designation of Whole Body and Secondary Contact Recreation as a result of stream classification of Black Creek, Deer Creek, and River Des Peres. Uncertainties concerning the classification of these waters are minimal and the assumptions made are very conservative and minimize or fully eliminate any risk to human health.

New Tables L and M; Addition of nutrient criteria on lakes: The central paradigm on which the rule is based comes from research that has been going on since the 1920's. That is

that the most commonly occurring water quality impairments in lakes and reservoirs result from loading of nitrogen and phosphorus in quantities that are significantly in excess of natural loading levels. These impairments include but are not limited to: frequent nuisance algal blooms, fish kills, overabundance or decline of macrophytes, and loss of top predators from the food chain (US EPA, 2000).

While the paradigm is well established, there is uncertainty about the degree of nutrient loading that will lead to impairment. A certain amount of nutrient concentration is desirable and necessary for the support of healthy aquatic ecosystems. There is no single nutrient concentration level that is appropriate for all lakes and reservoirs. Factors that affect threshold levels include the type of aquatic ecosystem in question, local geology, lake hydrology, turbidity resulting from sedimentation, and land cover.

The rule addresses these uncertainties with the delineation of nutrient criteria by reference values within ecoregions, incorporation of hydrologic factors, and identification of those water bodies that merit more stringent protections than the others within each ecoregion.

New Table K; addition of site-specific criteria for dissolved oxygen on East Fork Locust Creek and Little East Fork Locust Creek in Sullivan County, and West Fork Sni-a-Bar and Sni-a-Bar Creeks in Jackson County: Using data from reference waterbodies to determine criteria incorporates some uncertainty about the pollutant threshold at which an aquatic life use is impaired. Reference data represent the ambient levels of dissolved oxygen in unaffected streams. Because the reference data represent an unaffected environment, it is probable that aquatic life could reach full attainment in less optimum conditions. To account for this probability, the 90th percentile of daily mean minima was chosen for the criterion.

Correction of Typographical Errors: No uncertainties exist with respect to correcting the typographical errors.

13. A description of any significant countervailing risks that may be caused by the proposed rule.

Table A; Revised criteria for copper and zinc: There are no significant countervailing risks associated with the proposed rule specific to this section.

Ammonia Criteria: There are no significant countervailing risks associated with making the clarification proposed by this revision.

Tables G, H, and I; identification of classified and/or reference waters: There are no significant countervailing risks associated with the proposed rule specific to this section.

Table H; changes to the designation of Whole Body Contact Recreation and Secondary Contact Recreation as a result of Use Attainability Analyses: There are no significant countervailing risks associated with the proposed rule specific to this section. Environmental effects might come from the recommended use designations through the discharge of disinfection by products when chlorination is used as the disinfection process. Some residual

chlorine may enter the receiving water from the disinfection process unless dechlorination processes are required. Dechlorination may also introduce other contaminants, such as trihalomethanes, which may be carcinogenic. Where recreation does occur, the risks to human health from the by products are less severe than the risk of infection from non treated effluent. Where recreation does not occur, the addition of the by products would be the greater risk to the environment.

Table H; changes to the designation of Whole Body and Secondary Contact Recreation as a result of stream classification of Black Creek, Deer Creek, and River Des Peres.

It is very unlikely that the proposed classification would have any countervailing risks to the environment or to human health.

New Tables L and M; Addition of nutrient criteria on lakes: Because of the complexity of the nutrient issue, there may be some risk that, for any given water body, the proposed criteria may be too stringent to adequately support a desired aquatic ecosystem, or not stringent enough to protection for all of the lake's designated uses. The criteria were developed following months of analysis of long term data. The expertise and experience behind this effort will serve to minimize this type of risk.

The addition or alteration of phosphorus removal systems to point source facilities will result in increased production of sludge, due to the flocculation that results from the addition of alum to the wastewater stream. It is expected that this will only be a significant problem in larger facilities.

The proposed rule is likely to result in some point source facilities being required to add phosphorus control to their systems. It is possible that nitrogen control may be required in a few instances as well.

New Table K; addition of site-specific criteria for dissolved oxygen on East Fork Locust Creek and Little East Fork Locust Creek in Sullivan County, and West Fork Sni-a-Bar and Sni-a-Bar Creeks in Jackson County: The application of the new criterion may result in a lowering of dissolved oxygen within the targeted streams. Existing aquatic life are not expected to be affected by the change as the stream environments will be returning to a more natural condition and that full attainment of the aquatic life uses will remain protected.

Correction of Typographical Errors: No countervailing risks have been identified in association with correcting the typographical errors.

14. The identification of at least one, if any, alternative regulatory approaches that will produce comparable human health, public welfare or environmental outcomes.

Table A; Revised criteria for copper and zinc: The only alternative that would produce comparable human health, public welfare or environmental outcomes is the current rule, which is a little more stringent than the proposed one.

Ammonia Criteria: The department has not identified any alternative regulatory approaches that would produce comparable results.

Tables G, H, and I; identification of classified and/or reference waters: The department has not identified any alternative regulatory approaches that would produce comparable results.

Table H; changes to the designation of Whole Body Contact Recreation and Secondary Contact Recreation as a result of Use Attainability Analyses: The department has not identified any alternative regulatory approaches that would produce comparable results.

Table H; changes to the designation of Whole Body Contact and Secondary Recreation as a result of stream classification of Black Creek, Deer Creek, and River Des Peres: The department has not identified any alternative regulatory approaches that would produce comparable results.

New Tables L and M; Addition of nutrient criteria on lakes: The only viable alternative regulatory approach would be the adoption of EPA's national nutrient criteria. These are generally more stringent than what is in the proposed rule and they employ a different regional delineation. They do not account for the hydrologic factors that affect nutrient levels in lakes and reservoirs.

New Table K; addition of site-specific criteria for dissolved oxygen on East Fork Locust Creek and Little East Fork Locust Creek in Sullivan County, and West Fork Sni-a-Bar and Sni-a-Bar Creeks in Jackson County: The discussion in response to Section 8 of this report presents other regulatory approaches considered. As explained in that part of this RIR, none of the other approaches would produce a comparable or an acceptable result.

Correction of Typographical Errors: Correcting the typographical errors in this rulemaking is the only reasonable alternative for addressing the errors.

15. Provide information on how to provide comments on the Regulatory Impact Report during the 60-day period before the proposed rule is filed with the Secretary of State.

Regulatory Impact Reports for current rule developments of the Water Pollution Control Branch may be found on the Water Protection Rule Development Web page:
http://www.dnr.mo.gov/env/wpp/rules/wpp_rule_dev.htm.

The comment period for this Regulatory Impact Report is planned for May 21, 2008 through July 21, 2008.

Comments can be submitted by e mail to Phil Schroeder, phil.schroeder@dnr.mo.gov .
Comments may also be sent by mail to:

Phil Schroeder
Missouri Department of Natural Resources
Water Protection
P.O. Box 176
Jefferson City, Missouri 65102 0176

After publication in the Missouri Register, there will be another opportunity for public input during the open comment period and public hearing related to the proposed rulemaking prior to rule adoption.

16. Provide information on how to request a copy of comments or the web information where the comments will be located.

Comments received may be viewed on the department web site at http://www.dnr.mo.gov/env/wpp/rules/wpp_rule_dev.htm . Copies of these comments may also be requested directly from the program by e mail from Phil Schroeder phil.schroeder@dnr.mo.gov or by telephone: (573) 751 6623.